Intestinal Parasitosis and Under-nutrition in Ethiopia: Prevalence, Risk factors, and Prevention

Valorization

Valorization: Practical implications of findings

The findings of the studies in this thesis have significant implications on the health and development of school-aged children, as well as, the health of immunocompromised patients. Specific implications of the findings of each study, together with implementation and evaluation of simple hygiene and sanitation interventions in the prevention of IPIs and anaemia, are discussed in the respective Chapters. Here we summarise the overall implications of the major findings in this thesis.

Implication on the health of HIV/AIDS patients

The findings of these studies showed widespread prevalence of extracellular Intestinal Parasitic Infections (IPIs), and significant associations with poor personal hygiene and sanitation practices among antiretroviral treated (ART) patients. The negative contributions of IPIs to the rapid progression of diseases caused by HIV infection are long established. Identification of parasitic agents residing in the gastro-intestinal tract, and factors associated with high prevalence of IPIs among HIV/AIDS patients under ART, assist to optimise treatment and control measures that would improve the quality of life of these patients. The findings have highlighted the need for a better scheme of follow-up to improve the quality of care for HIV/AIDS patients under ART. Incorporation of regular stool tests and health education programmes that would help adopt preventive measures against IPIs for patients under care in ART programmes could be essential for the betterment of health services and hence, increase the likelihood of desired health outcomes in impoverished settings of the developing world.

Implication of prevalence and risk factors assessment in children

Children in developing settings are amongst the populations most affected by the deleterious health and developmental impacts of IPIs and under-nutrition. Both IPIs and under-nutrition share similar geographic distribution in the impoverished areas of the developing world and create a cyclic impact, ultimately contributing to defects in health, growth, and other forms of development among children. Prevention and control of IPIs (both helminthes and protozoa) and alleviation of under-nutrition (both micronutrient and protein-energy under-nutrition) are recognised as a priority for achieving the United Nations' Millennium Development Goals (MDGs). To be effective, interventions aimed at reducing the effects of infection and under-nutrition must be based on a proper assessment of the existing situation. Chapter 3 of this thesis investigated the prevalence and associated risk factors for intestinal parasitosis, anaemia and protein-energy under-nutrition among school children in northern Ethiopia. Findings in this chapter indicate a widespread occurrence of IPIs and under-nutrition among children. Poor personal hygiene and sanitation habits were generally associated with anaemia, thinness and IPIs. Children who had unclean hands were

more often anaemic and thin. The findings emphasise the need for an increased access to clean water and latrines, and hygiene and sanitation communication activities to improve the health status of children living in endemic areas of the country.

The study used mobile phones to collect epidemiological data, which showed great potential as a more efficient tool for data collection in the remote field settings. Furthermore, the findings from the present study motivated the interest to design inexpensive and simple public health hygiene interventions and empirically assess their impacts in preventing IPIs and anaemia among school-aged children.

Implications of hand-washing and nail clipping on child health

IPIs and anaemia are of high prevalence among children in the developing regions of the world. School-aged children bear heavy worm burden from intestinal parasitic infections and are both the principal sufferers and source of transmission in a community. The results from the RCT indicated that hand-washing with soap at critical times and weekly fingernail clipping interventions were very efficacious in reducing intestinal parasite re-infection rates, the size of worm burden, and the prevalence of anaemia among the children. Given the notable health and developmental impacts of IPIs and anaemia on children, the implication of these findings extends well beyond simple short-term health benefits among these age groups. By reducing infection intensity, the interventions can prevent serious morbidity in infected children, aligning the effects of these simple public health interventions to be consistent with the rationale of deworming programs. Further, the efficacy in lowering infection intensity (worm burden) also suggests external benefit from reduced environmental contamination and hence reduced infection transmission in the community on a larger scale.

Long-term protection against IPIs and anaemia could be successfully achieved through public and economic development; however this is unattainable in a short period of time for poorer countries like Ethiopia. The current strategy of periodic treatment of at-risk individuals also has constraints due to systemic difficulties of drug provision, fear of increased potential of drug resistance and the short-lasting impact of treatment due to the frequent re-infection rate in endemic areas. Hand-washing with soap and nail clipping interventions, therefore have demonstrated to be an efficacious complementary measures that could help to lower the dependency on a ‘drug only’ approach and enhance sustainability of protective measures with available resources.

The important link between IPIs and anaemia reinforce the likelihood that proper hand-washing with soap can be used as comprehensive public health intervention to break this link and stop the deleterious health impacts of infection and anaemia in children.

Further, the substantial decline in intestinal parasite re-infection rates as a result of the interventions was seen among all children despite differences in their background.

The studies in this thesis were conducted in a resource-constrained country (Ethiopia) and have targeted vulnerable groups living in marginalised rural and urban areas. The findings presented in this thesis could be both useful and applicable to other children living in endemic areas throughout the world.